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# American Fern Journal

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## The Ferns of Brazos Canyon, New Mexico \*

BY PAUL C. STANDLEY

Brazos Canyon is located in northern Rio Arriba County, New Mexico, eight miles east and north of the county seat, Tierra Amarilla. It is perhaps 30 miles south of the Colorado line, about half way across the State, the nearest railroad station being Chama, twenty-two miles to the north. In 1911 the writer spent ten days at Chama, for the purpose of collecting plants, and in August and September, 1914, in company with Mr. H. C. Bollman, he camped for four weeks along the Brazos River, near the mouth of the canyon proper. Although the camping expedition was primarily a vacation trip, a large collection of plants was secured, several of which were not known previously from the State. The most interesting group in the region is the ferns. During recent years large collections of plants have been made in many parts of New Mexico, and since most collectors pay particular attention to ferns a large number are known to occur in the State. Consequently, the writer was much surprised to find two additions to the fern flora.

The Rio Brazos is a good-sized mountain stream of clear, cold water, which dashes down over great boulders,

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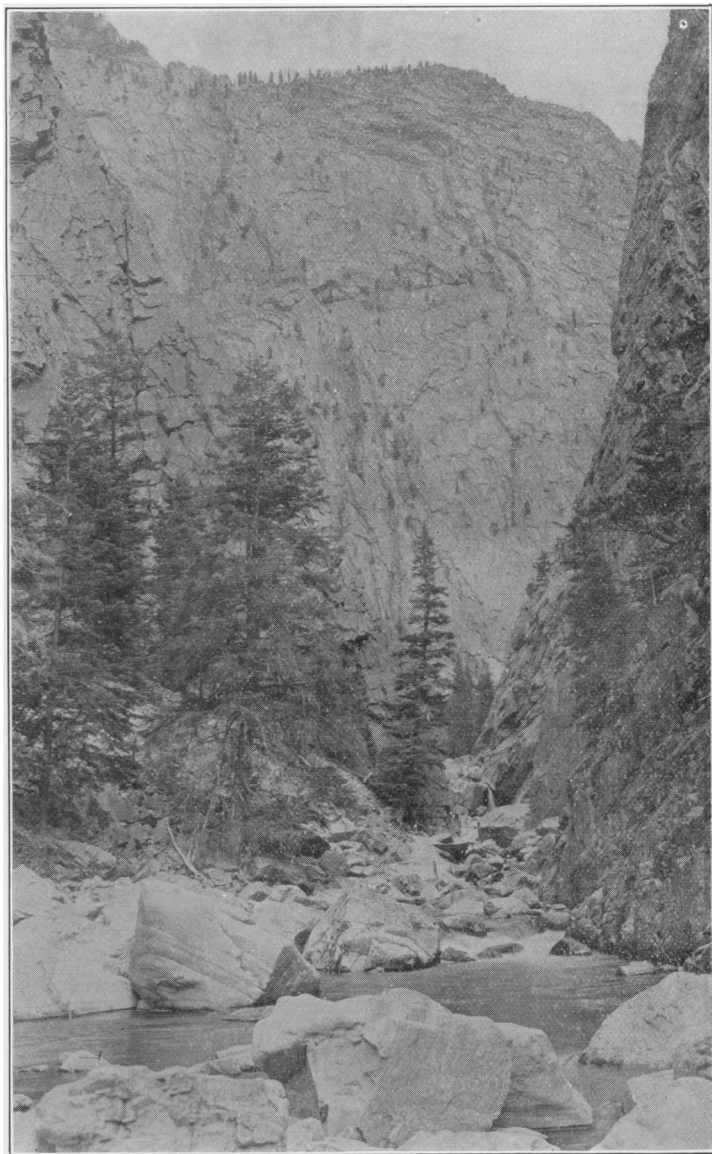


PLATE 1.—A Scene in Brazos Canyon.

forming here and there deep, dark green pools, and finally reaching the valley of the Chama River, where it becomes slower and shallow. For most of its course it traverses a high plateau, through which it has cut a deep, narrow gorge, in some places not more than a hundred yards wide, bounded by vertical cliffs from two to three thousand feet high. Viewed from a short distance the cliffs appear nearly bare of vegetation, aside from the scattered spruces that have gained a precarious footing in earth-filled crevices, but a closer inspection shows them covered with small lichens, whose colors take on intenser hues in wet weather and produce a conspicuous change in the coloration of the rocks. Narrow crevices in these rocks are a favorite habitat of several ferns. The summits of the cliffs and their basal slopes, where the canyon widens, support a heavy plant growth which can be readily divided into two life zones. The "box" of the canyon proper, the higher slopes of the mountains, as well as their northern slopes at lower levels, and the banks of the streams, are densely covered with vegetation characteristic of the Canadian Zone. The trees here are the Rocky Mountain white pine (*Pinus flexilis*), Colorado blue spruce (*Picea Parryana*), Douglas spruce (*Pseudotsuga mucronata*), white fir (*Abies concolor*), and aspen (*Populus aurea*). The plant life of the lower slopes and of the great rock slides at the base of the cliffs is typical of the Transition Zone. The only tree is the Rocky Mountain yellow pine (*Pinus brachyptera*), except along the streams, whose banks are fringed with the mountain cottonwood (*Populus angustifolia*). Beneath the pines there is usually a thick shrubby undergrowth, composed chiefly of deciduous scrub-oaks, with a preponderance locally of choke-cherry (*Padus melanocarpa*) and service-berry (*Amelanchier* sp.).

In this restricted region the writer collected the twelve species of ferns and fern allies which are enumerated below.

**POLYPODIUM HESPERIUM** Maxon. It is not certain that any representative of this genus has been collected before in New Mexico. There is a report of the occurrence of this species in the Sandia Mountains, east of Albuquerque; but the specimens upon which the record is based are lost, and there is a possibility that they really did not come from the State. The species is the most local of any found in the Brazos region, for it was seen in only two restricted localities. In both instances it grew in crevices on the under side of large granitic rocks, on a northward slope among firs and aspens. But two small cliffs were inhabited by the plants, which were sufficient for only a few sheets of specimens. The species is local in Arizona, and in Rydberg's *Flora of Colorado* only a single locality is reported for that State, a station near Ouray, approximately one hundred and twenty-five miles northwest of the one in New Mexico. In the United States National Herbarium, however, there is another sheet of somewhat depauperate specimens, apparently referable here, collected at Twin Lakes, in central Colorado, by John Wolf.

The New Mexican specimens are quite uniform in the size and form of the fronds, which are very narrow, with narrow segments. They are not exactly matched by any others in the National Herbarium and may represent an undescribed species. In some respects they resemble the form of *Polypodium hesperium* described from Arizona by Mr. Clute as *P. vulgare perpusillum*, but their fronds and segments are still narrower.

**DRYOPTERIS FILIX-MAS** (L.) Schott. This species is not common in the State, although it extends as far south as the Organ Mountains, near the Texan border. In Brazos Canyon it is rather abundant, less so, however, than *Athyrium*. Most frequently it grows in crevices of rocks, in damp shady spots along small brooks. It

occurs in many places along the cliffs inside the "box," and it grew on one of the cliffs with the *Polypodium*.

**WOODSIA SCOPULINA** D. C. Eaton. Upon the summits of rocks, usually in exposed places, this species is common. Where they are exposed to the direct rays of the sun the plants are dwarfed, but in protected situations they attain a height of 18 cm.

**WOODSIA MEXICANA** Fée. On a shaded cliff a form which differs somewhat from the typical one, but referred here for the present, was collected. *Woodsia mexicana*, so-called, is the common Woodsia of the State.

**FILIX FRAGILIS** (L.) Underw. Although one of the two commonest ferns of New Mexico, this is infrequent along the Brazos. It was seen in only a few localities, usually drooping from crevices of cliffs. The fronds were unusually large and finely dissected.

**PTERIDIUM AQUILINUM PUBESCENS** Underw. This and *Filix fragilis* are the most abundant and widely distributed ferns of New Mexico, being found in all the higher mountain ranges. The bracken thrives best among the aspens of the Canadian Zone, but now and then it intrudes among the yellow pines. From a distance the large patches, turning bright yellow in September like the aspens, were a conspicuous feature of the hillsides. Many of the fronds were infested with what appeared to be a fungus.

**CRYPTOGRAMMA ACROSTICHOIDES** R. Br. One of the most widely distributed of endemic western ferns, the parsley fern probably reaches the southeastern limit of its range in Rio Arriba County. Although it is very abundant about the Brazos Canyon, it had never been collected in New Mexico before, and probably within



PLATE 2.—*Athyrium cyclosorum* along a small brook. The clumps are 4 to 6 feet in diameter.

the State it is restricted to this mass of mountains. The writer discovered it first on cliffs just at the mouth of the canyon. Later it was found in many places inside the canyon and on the rock slides higher up. It grows usually in the shade of rocks, but in protected places it thrives in moist gravelly soil. The plants vary greatly in size, according to insolation and available moisture.

ASPLENIUM TRICHOMANES L. A few plants were found in two localities, in both instances on moist shaded cliffs.

ATHYRIUM CYCLOSORUM Rupr. Nowhere else in New Mexico, probably, is this fern so abundant as here. It reaches the largest size of any fern in the State, some of the fronds being over four feet long. On the upper Pecos River, east of Santa Fe, in 1908, the writer, in three months' collecting, found only a single small clump of the plants. Here in Brazos Canyon along the small brooks they were everywhere, furnishing in some places the most conspicuous element of the herbaceous vegetation. Great masses of the fronds, three to four feet high, intermingled with *Rudbeckia laciniata*, *Aralia bicrenata*, and *Aconitum*, lined the banks of the brooks, forming a beautiful picture. The tall, heavily fruited fronds are found in the large clumps; small and probably younger plants growing with them have shorter fronds, although these too are fertile.

ASPLENIUM SEPTENTRIONALE L. It was a pleasant surprise to come upon this peculiar little fern, even though it was not new to the State flora. While it has a wide range in the western United States and in Europe, it appears to have a decidedly local distribution, in America at least. In 1911, the writer found a few plants on the under side of a rock near the base of the



Sierra Grande in the northeast corner of New Mexico. In the Brazos Canyon the species is fairly abundant, if one takes the pains to look for it. The grasslike fronds in crowded masses are so little suggestive of a fern that one is likely to pass them by, though once distinguished they cannot be confused with any other plant. The plants occur in narrow crevices of the rocks, either on the under side in shade or on the upper side in the fierce glare of the sun. So well down do their roots extend into the crevices that it is almost impossible to dig the plants out intact. The dead fronds persist for a long time.

*EQUISETUM ARVENSE* L. Almost anywhere along the Rio Brazos this species is abundant, and the bright green vegetative stems are a conspicuous feature in the sandy soil at the edge of the water. In August and September the fertile stems had withered, but everywhere in the moss about the vegetative stems were the sharp-pointed buds which were to develop into fruiting stems the next season. Another species of *Equisetum* with stout, simple, perennial stems was noticed in several places, along with *E. arvense*, but as it was not in fruit it was not collected. Probably it was *E. laevigatum*.

*SELAGINELLA UNDERWOODII* Hieron. In a single locality, upon the northward face of a cliff, a few mats of this plant were found. In habit and general appearance it bears more resemblance to a moss than do our other New Mexican species. It is far from rare in the State, especially in the Santa Fe and Las Vegas Mountains. It was described from specimens collected by Fendler, in 1847, in the mountains near Santa Fe.

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